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Science and Technology for Tomorrow's Air and Space Force

Success Story

ENGINEERS DEVELOP FIRST RESPONSE EXPEDITIONARY FIRE VEHICLE

The Materials and Manufacturing Directorate-developed First Response Expeditionary (FRE) fire vehicle bridges the gap between flight line fire extinguishers and full-sized crash and rescue fire trucks. FRE is ideal for small aircraft and helicopter crashes, for hot pit refueling, and for tent city or deployed-base fire protection.

Directorate engineers designed FRE to provide firefighters with a quick-reaction capability to extinguish small aircraft or structural fires before they become uncontrollable. Users can operate the vehicle with minimal training or experience. FRE is virtually maintenance free and is adaptable to a wide variety of mission profiles and vehicle platforms. In addition, the FRE vehicle occupies minimal pallet space on a cargo aircraft and offers reduced water requirements and equipment weight.

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Accomplishment

Directorate engineers have developed a deployable, lightweight vehicle that provides crash and rescue firefighting capability in a variety of mission profiles. The FRE fire vehicle, developed to meet Air Combat Command (ACC) and Civil Engineering requirements, has already established its value during Operation IRAQI FREEDOM when ACC deployed several of the units to protect helicopters, aircraft, tent cities, and other bare base operations.

Background

The P-19 firefighting vehicle, using aqueous film fighting foam, is the standard fire truck usually deployed to remote locations for firefighting purposes. However, the P-19 is most effective in extinguishing two-dimensional (2-D) or pool fires. Many times, pool fires become 3-D when fed by fuel or another flammable liquid coming from an aircraft's damaged fuel or hydraulic lines. This phenomenon makes the fire extremely difficult to extinguish.

In response to an urgent need for an easily operable, lightweight, air transportable, highly-effective firefighting system, engineers, at the directorate's Airbase Technologies Division, developed a system capable of effectively and successfully fighting both 2-D and 3-D hydrocarbon fuel fires.

The FRE vehicle consists of a Rosenbauer ultra high pressure water system with a 2-cylinder, 22 horsepower Briggs and Stratton engine and 1,500 pounds per square inch of pressure pump. The 60-gallon system provides 14 gallons per minute of foam/water to the aspirated/non-aspirated nozzle, which delivers the firefighting agents in either a mist, stream, or aspirated foam. The unit, fabricated by directorate engineers, uses a John Deere military gator as its vehicle platform.

Directorate engineers made several modifications to the FRE system to increase its effectiveness. These changes include modifying the original nozzle design to combine aspirated and non-aspirated foam functions, increasing the engine size to accommodate a higher flow rate, exchanging the foam tank for a standard 5 gallon foam can, adding a sump pump to draft water from alternative sources, and adding a 1 kW generator to operate additional tools.

The directorate delivered six prototype units to ACC and to the US Central Command Air Forces. The directorate plans to provide two more units to the Air Force Special Operations Command. The directorate is transitioning this technology to Rosenbauer America, who will make the system available for additional fire protection and crash and rescue efforts.

Materials and Manufacturing
Support to the Warfighter

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-ML-41)